表紙・目次・正誤表・シンポジウムプログラム他

The Second International Symposium on Cnidaria

Shirahama and Kushimoto

October 16–19, 1972

RECENT TRENDS IN RESEARCH IN COELENTERATE BIOLOGY

1973

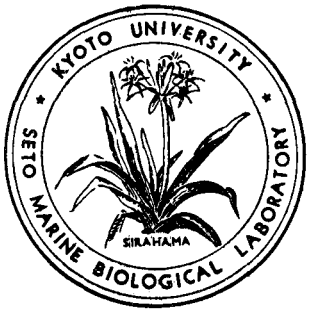
Recent Trends in Research in Coelenterate Biology

KYOTO UNIVERSITY

PUBLICATIONS OF THE SETO MARINE BIOLOGICAL LABORATORY

Volume XX

Proceedings of the Second International Symposium on Cnidaria, Shirahama and Kushimoto, Japan, October 16–19, 1972



SHIRAHAMA, WAKAYAMA-KEN, JAPAN
1973

CITATION OF PAPERS FROM THIS VOLUME

For consistency and to prevent confusion, workers citing papers from this volume are urged to adopt the following form as an abbreviated title of the volume:

Publ. Seto Mar. Biol. Lab., vol. 20 (Proc. Second Internat. Symp. Cnidaria).

CORRIGENDA
for
"The Role of the Gonomedusa and Gonangium in the Sexual Reproduction (Fertilization) of the Hydrozoa" by R.L. MILLER (pp. 367-400 of the Proceedings)

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Page	*Line*	*For*	*Read*
367	22	at first, and	and,
	23	brooding chamber	brood chamber
368	3	even gonangia	gonangia
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	19	of jelly to	of jelly, to
369	7	(Fig. 1A, 2B)	(Fig. 1A, B)
	39	*Campanularia urceolata*	*Orthopyxis caliculata*
Caption for Fig. 2	9	at least 4–5 folds	at least 4–5 fold
372	10	(MILLER, 1970; see below).	(MILLER, 1970; see section II, A).
Fig. 3		B	C
		C	E
		D	B
		E	D
Caption for Fig. 3.	6-7	(From MILLER, 1972a,	(From MILLER, 1973,
375	5	pre-maturation form	pre-maturation development
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377	17	(MILLER, 1970b, 1972b)	(MILLER, 1970, 1972)
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* Sperm permitted to swim for 15 to 50 minutes.

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395	7	(1966, 1972a,b).	(1966, 1972, 1973).
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	21	O'RAND *et al.*, 1973)	O'RAND *et al.*, 1974)
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Caption for Fig. 17	1	*Campanularia urceolata*	*Orthopyxis caliculata*
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The Proceedings of the Second International Symposium on Cnidaria

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(Recent Trends in Research in Coelenterate Biology)

Edited by

TAKASI TOKIOKA *in collaboration with* SABURO NISHIMURA

Seto Marine Biological Laboratory
Shirahama, Japan

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Dedicated to
the late Dr. TAKU KOMAI

Dr. TAKU KOMAI 1886–1972

Professor emeritus of
Kyoto University
and
Director of
The Seto Marine Biological Laboratory
for
1925–1929 and 1937–1946

BRIEF MEMOIR OF DR. TAKU KOMAI

Dr. T. KOMAI was born on May 9, 1886 in Himeji as a son of the FUKUDAS. He went on to the Tokyo Higher Normal School from the Himeji Middle School and passed several years in Kagoshima Prefecture as a teacher of a middle school after he graduated from the Higher Normal School in 1908. His papers in marine biology began to appear in this period, with some reports on Stomatopoda. Then he entered the Zoological Institute, Fuculty of Science of Tokyo Imperial University as a non-regular student, finished the course in 1917, but stayed there till he moved to Kyoto Inperial University as an assistant professor in 1920. He was captured by coelenterates in those days, and he was awarded in 1924 the degree of Sc. D. for his famous paper on two aberrant ctenophores (1922).

The most important work during his stay in Europe and the U.S. in 1923–1925 was to introduce the genetics into Kyoto Imperial University from the Zoological Department of Columbia University, New York, with the techniques of culturing *Drosophila*. This was not strange, as the other half of his biological interest had been paid on the variability of organisms as seen in his early papers. He was appointed in 1925 to a professor of the Zoological Institute, Faculty of Science, Kyoto Imperial University; for four years (1928–1932) to a part-time professor of Tokyo Imperial University. He had been the Dean of the Faculty of Science, Kyoto Imperial University, for two years (1944–1946) before he retired in 1946.

He was elected to a member of Japan Academy in 1949 and for two years (1950–1952) to a member of Japan Science Council. After the retirement from Kyoto University, his biological activity was concentrated into the field of genetics, mainly population genetics and human genetics. Actually he worked for six years (1950–1956) as a research director in the National Institute of Genetics. However, he had continuously deep concern for marine biology, especially for coelenterates. Really his last writing in his last letter of May 19, 1972 concerned the coming symposium on Cnidaria, as read as "I had better make a donation to the symposium fund right now, as I feel much exhausted these days and I am not sure to survive coming summer—". He went out of the world about fifty days later on July 9, 1972, leaving a number of successors in both fields of marine invertebrates and genetics.

LIST OF DR. T. KOMAI'S PUBLISHED PAPERS

In addition to the following papers on marine invertebrates, about 80 genetical papers, treating butterflies, *Drosophila,* lady-beetle, land-snail, mammals and human being, were presented by him. Further, several books were published by him, too. It is to be noted that he was one of orthodox Darwinians and some of his books were devoted to tell about Charles DARWIN and his evolution theory.

Papers with asterisk were published by the name of Taku FUKUDA.

Ctenophora and Other Coelenterata

1918. On ctenophores of the neighbourhood of Misaki. Annot. Zool. Japon., 9: 451–474, 1 pl.
1918. クラゲムシの発生の大要. 動 雑, 30: 484–489. (The outline of the development of *Coeloplana.* Zool. Mag., 30: 484–489).
1920. Notes on *Coeloplana bocki* n. sp. and its development. Annot. Zool. Japon., 9: 577–584.
1920. Preliminary notes on *Gastrodes parasiticum* KOROTNEFF, with remarks on its systematic position. Annot. Zool. Japon., 9: 585–590.
1921. Notes on the two Japanese ctenophores, *Lampetia pancerina* CHUN and *Beroe ramosa* n. sp. Annot. Zool. Japon., 10: 15–18.
1922. Studies on two aberrant ctenophores, *Coeloplana* and *Gastrodes.* 1–102, 9 pls. Privately published.
1931. On the hydroid stage of *Cytaeis japonica* UCHIDA. Annot. Zool. Japon., 13: 255–258.
1931. 腔腸類. 岩波講座 生物学の中: 1–102, 4 図版. (Coelenterata. *In* Lectures in Biology, 1–102, 4 pls., Iwanami-Shoten, Tokyo).
1932. On two species of athecate hydroids associated with scorpenoid fishes. Annot. Zool. Japon., 13: 445–459, 3 pls.
1933. Notes on SEMPER's larvae found in the vicinity of Seto. Annot. Zool. Japon., 14: 67–77, 1 pl.
1934. On the structure of *Ctenoplana.* Mem. Coll. Sci. Kyoto Imp. Univ., B. 9: 245–256.
1935. On *Stephanoscyphus* and *Nausithoe.* Mem. Coll. Sci. Kyoto Imp. Univ., B. 10: 289–339, 2 pls.
1936. イラモ *Stephanoscyphus* に就て. 動 雑, 48: 535–544. (On *Stephanoscyphus.* Zool. Mag., 48: 535–544).
1936. The nervous system in some coelenterate types. 1. *Coeloplana.* Mem. Coll. Sci. Kyoto Imp. Univ., B. 11: 185–191.
1936. On another form of *Stephanoscyphus* found in the waters of Japan. Mem. Coll. Sci. Kyoto Imp. Univ., B. 11: 175–183.
1939. (with Y. TOKUOKA). Further observations on the strobilation of *Stephanoscyphus.* Mem. Coll. Sci. Kyoto Imp. Univ., B. 15: 127–133.
1939. On the enigmatic coelenterate *Tetraplatia.* Jap. Jour. Zool., 8: 231–250, 1 pl.
1939. 謎の腔腸動物 *Tetraplatia.* 動 雑, 51: 365–367. (*Tetraplatia,* an enigmatic coelenterate. Zool. Mag., 51: 365–367).
1940. (with T. TOKIOKA). *Kiyohimea aurita,* n. gn., n. sp., type of a new family of lobate Ctenophora. Annot. Zool. Japon., 19: 43–46.
1941. A new remarkable sessile ctenophore. Proc. Imp. Acad. Tokyo, 17: 216–220.
1942. (with T. TOKIOKA). Three remarkable ctenophores from the Japanese seas. Annot. Zool. Japon., 21: 144–151.
1942. The structure and development of the sessile ctenophore *Lyrocteis imperatoris* KOMAI. Mem. Coll. Sci. Kyoto Imp. Univ., B. 17: 1–36, 3 pls.
1942. 琴水母と其の近似種. 植物及動物, 10: 15–18, 109–112, 209–216. (*Lyrocteis* and allied forms. Plants and Animals, 10: 15–18, 109–112, 209–216).

1942. 扁櫛類に就いて. 広島文理科大学博物学会誌, 10: 1–4. (On Platyctenidea. Bull. Nat. Hist. Soc., Hiroshima Bun-Rika Univ., 10: 1–4).
1942. The nematocysts in the ctenophore *Euchlora rubra*. Proc. Imp. Acad. Tokyo, 18: 255–256.
1942. The nervous system in some coelenterate types. 2. Ephyra, scyphula. Annot. Zool. Japon., 21: 25–29.
1944. (with I. YAMAZI). The asexual reproduction of the hydromedusa *Gastroblasta chengshanensis*. Annol. Zool. Japon., 22: 105–108.
1945. (with I. YAMAZI). Order found in the arrangement of organs and zooids in some medusae. Annot. Zool. Japon., 23: 1–6.
1947. 日本産二種の淡水水母. 生物, 2: 15–17. (Two limnomedusae from Japan. Seibutsu, 2: 15–17).
1947. 腔腸動物の或種に見られる器官又は個虫の葉序式配列. 動 雑, 57: 98–100. (Phyllotaxis-like arrangement of organs or zooids in some coelenterates. Zool. Mag., 57: 98–100).
1951. The nematocysts in the ctenophore *Euchlora rubra*. Amer. Nat., 85: 73–74.
1951. Phyllotaxis-like arrangement of organs and zooids in some medusae. Amer. Nat., 85: 75–76.
1955. 日本近海の櫛水母概説. 日本生物地理, 16–19: 13–14. (Synopsis of Ctenophora in the Japanese waters. Biogeography of Japan, 16–19: 13–14).
1963. A note on the phylogeny of the Ctenophora. *In* Lower Metazoa, Comparative Biology and Phylogeny. E.C. DOUGHERTY and others ed., 181–188. Univ. California Press.

Stomatopoda and Other Crustacea

*1908–'09. 日本産口脚類. 動 雑, 20: 505–512, 21: 55–62, 167–174, 5 (Japanese Stomatopoda. Zool. Mag., 20: 505–512, 21: 55–62, 167–174, 5 pls.)
*1909. Report on Japanese Stomatopoda with descriptions of two new species. Annot. Zool. Japon., 7: 139–152, 1 pl.
*1910–'11. 日本産口脚類追補. 動 雑, 22: 23: 173–175, 1 図版 (Supplement to Japanese Stomatopoda. Zool. Mag., 22: 23: 173–175, 1 pl.)
*1911. Further report on Japanese Stomatopoda with descriptions of two new species. Annot. Zool. Japon., 7: 285–290, 1 pl.
*1913. 日本産口脚類二種類並日本近海産口脚類目録. 動 雑, 25: 69–72. (Two Japanese stomatopods, with the list of stomatopods in the Japanese waters. Zool. Mag., 25: 69–72)
1914. 日本産口脚類の数種に就て. 動 雑, 26: 459–468, 1 図版 (On some Japanese stomatopods. Zool. Mag., 26: 459–468, 1 pl.)
1920. Spermatogenesis of *Squilla oratoria* DE HAAN. Jour. Morph., 34: 307–333, 3 pls.
1922. A case of conspicuous sexual difference in coloration in stomatopod, with notes of a male with coloration approaching that of the female. Annot. Zool. Japon., 10: 101–107.
1924. Development of *Squilla oratoria* DE HAAN. 1. Change in external form. Mem. Coll. Sci. Kyoto Imp. Univ., B. 1: 273–283, 1 pl.
1927. Stomatopoda of Japan and adjacent localities. Mem. Coll. Sci. Kyoto Imp. Univ., B. 3: 307–354, 2 pls.
1929. (with Y.M. TUNG). Notes on the larval stages of *Squilla oratoria*, with remarks on some other stomatopod larvae found in the Japanese seas. Annot. Zool. Japon., 12: 187–237, 9 pls.
1930. (with Y.M. TUNG). Report on the Stomatopoda collected by the surveying ships of the Imperial Fisheries Experimental Station on the continental shelf bordering Japan. Annot. Zool. Japon., 13: 13–19.
1931. (with Y.M. TUNG). On some points of internal structure of *Squilla oratoria*. Mem. Coll. Sci. Kyoto Imp. Univ., B. 6: 1–16, 2 pls.
1932. An enormous swarm of stomatopod larvae. Annot. Zool. Japon., 13: 351–354.
1932. Report of the biological survey of Mutsu Bay. 24. Stomatopoda. Sci. Rep. Tohoku Imp. Univ., 4. Biol.: 7

1938. Stomatopoda occurring in the vicinity of Kii Peninsula. Annot. Zool. Japon., 17: 264–275.
1940. *Gonodactylus furcicaudatus*, a remarkable stomatopod. Annot. Zool. Japon., 19: 47–50.
1922. (with K. AKATSUKA). *Pseudocrangonyx*, a new genus of subterranean amphipods from Japan. Annot. Zool. Japon., 10: 119–126.
1924. Notes on *Sarcotaces pacificus*, n. sp. with remarks on its systematic position. Mem. Coll. Sci. Kyoto Imp. Univ., B. 1: 265–271, 1 pl.

Prochorda

1932. On some Salpas occurring in the vicinity of Seto, with remarks on the enantiomorphism found in some aggregated forms. Mem. Coll. Sci. Kyoto Imp. Univ., B. 8: 65–80.
1949. Internal strucrure of the pterobranch *Atubaria heterolopha* SATO, with an appendix on the homology of the "notochord". Proc. Jap. Acad., 25: 19–24.
1951. The homology of the "notochord" found in pterobranchs and enteropneusts. Amer. Nat., 85: 270–271.

THE SLOVENIAN ACADEMY OF SCIENCES AND ARTS AND ITS INSTITUTE FOR BIOLOGY ANNOUNCE IN DEPP SORROW, THAT ON THE 11th DECEMBER, 1972 DEPARTED THIS LIFE

ACADEMICIAN

Profesor JOVAN HADŽI, D. Sc. & D. H. C.

BIOLOGIST OF INTERNATIONAL REPUTATION, REGULAR MEMBER OF THE SLOVENIAN ACADEMY OF SCIENCES AND ARTS, HEAD OF THE INSTITUTE FOR BIOLOGY OF THE SASA, UNIVERSITY PROFESSOR IN ORDINARY EMERITUS, FREE MEMBER OF THE YUGOSLAVIAN ACADEMY OF SCIENCES AND ARTS AT ZAGREB, AND OF THE SERBIAN ACADEMY OF SCIENCES AND ARTS AT BELGRADE, HONORARY MEMBER OF THE SOCIETY FOR NATURAL HISTORY AND OF THE SOCIETY FOR THE RESEARCH OF CAVES OF SLOVENIA, CONTRIBUTING MEMER OF THE "ČESKOSLOVENSKE AKADEMIE VED" AT PRAGUE, HONORARY MEMER OF THE "SOCIEDAD ESPANOLA DE HISTORIA NATURAL" AT MADRID, BEARER OF HIGHEST AWARDS FOR SCIENTIFIC WORK AND OF OFFICIAL DECORATIONS

THE MEMORY OF THIS DISTINGUISHED MEMBER OF GREAT MERIT, HEAD OF THE INSTITUTE OF MANY YEARS' STANDING, PRECIOUS COLLABORATOR, EXCELLENT SCIENTIST AND EXPERT WILL LAST IN OUR HEARTS AND IN HIS WORKS FOREVER

All the participants to and those who were concerned with the Symposium

express their regret over the death of

Dr. Jovan HADŽI.

PROPOSAL OF AN INTERNATIONAL SYMPOSIUM ON CNIDARIA

October, 1971

Ladies and Gentlemen,

As generally known, the symposium on "The Cnidaria and their Evolution" held at the Zoological Society of London, March 1965, proved a complete success. Unfortunately, the organizer Dr. William J. REES to whom all participants and all scientists interested in coelenterate biology are indebted, died much too early.

The "First International Symposium on Zoophylogeny" held at Salamanca, Spain, October 1969, has proved a second mark of the way in which modern aspects lead to a better understanding of the biology of coelenterates. Under the subtopic "Metazoa Diblastica", some results of real observations and others of more speculative character were presented, though from the point of evolution only.

At Salamanca some participants of both symposia discussed the interesting problems; they came to the conclusion that the time now seems to be ripe for a new workshop-symposium the aim of which should be to give a comprehensive survey on the present state of knowledge and more, to discuss the interesting problems and to show also the gaps of knowledge.

In a preliminary way the symposium could run under the title "Recent Trends in Research in Coelenterate Biology" with the following topics: a) morphogenesis and developmental physiology, b) systematics and evolution, c) behaviour and ecology, d) experimental ecology, physiology and metabolism, e) nervous system and neural conduction, f) histology and fine structure (electron microscopy), g) nematocysts.

In respect of country and place, Japan has a good tradition in research work on coelenterates. So Japanese colleagues will be glad to invite all interested scientists from all over the world who are engaged actively in research on the several groups of coelenterates. The place could be a new Marine Park Research Station at Kushimoto, southern point of Kii Peninsula, and the well-known Seto Marine Biological Shirahama, Wakayama-ken, located not far from Kushimoto. Time: October 16th to 19th incl., 1972.

Please be kind enough to return the enclosed preliminary registration form as soon as possible if you are able and willing to attend the planned symposium. Any suggestions to make the symposium as effective as possible are highly requested. The further details are to be issued later.

Dr. B. WERNER
Biologische Anstalt Helgoland
Dr. E. HIRAI
Asamushi Marine Biological Station
Dr. T. UCHIDA
Sabiura Marine Park Research Station

PARTICIPANTS TO THE SYMPOSIUM

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Dr. ARAI, MARY N.: Department of Biology, University of Calgary, Calgary 44, Alberta, CANADA, with Mr. ARAI

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Dr. KAWAGUTI, SIRO: 1809–29, Tsushima, Okayama, JAPAN 700*

*Present address is shown (Sept., 1973). — THE EDITORS.

INVITATION TO THE SECOND INTERNATIONAL SYMPOSIUM ON CNIDARIA

RECENT TRENDS IN RESEARCH IN COELENTERATE BIOLOGY

December 15, 1971

Reacting to the proposal, an international symposium on Cnidaria will be held at Shirahama and Kushimoto by invitation of Dr. Tohru UCHIDA, who will be the president of the symposium, from October 16th (Mon.) to 19th (Thurs.) incl., 1972. The language will be solely in English.

The arrangement will be made by the Seto Marine Biological Laboratory of Kyoto University in Shirahama and the Sabiura Marine Park Research Station in Kushimoto.

Programme: You and your colleagues are invited to present papers on the following subjects;

1) Morphogenesis and developmental physiology,
2) Systematics and evolution,
3) Behaviour and ecology,
4) Physiology and metabolism, and
5) Histology and fine structure.

Papers presented at the symposium should not exceed 30 minutes in length including the time for discussion. Facilities for projecting slides and 16 mm film will be available.

It may be necessary to make a selection from the papers submitted to ensure a lively discussion in the time available. We hope you will appreciate this necessity.

All speakers are asked to submit by June 30 a short abstract, no longer than one typewritten page. These abstracts will be mimeographed to be distributed to all participants prior to sessions. Full manuscripts should be submitted before October 31 to make publication possible by the end of March, 1973. All papers will be published in volume 20 of the journal "Publications of the Seto Marine Biological Laboratory". All participants will receive a copy of this volume and 100 reprints of their own papers.

Accomodation: There are many *ryokan* (inns in Japanese style, some with a private bath and a toilet room) of different classes in the town of Shirahama, where supper and breakfast are served, but only a few hotels. Generally, hotel accomodation is more expensive and may be somewhat limited as the town is one of popular seaside resorts in this country. It is recommendable therefore that you will try some *ryokan* to add

some strange page to your experiences. Most of the accomodation is within the distance 3 km from the Seto Marine Biological Laboratory. Transportation to and from the place of meeting will be served.

Cost for ryokan: 3,000 to 5,000 yen or more per night, inclusive of supper and breakfast, but tax and attendance excluded.
for hotels: 6,000 to 10,000 yen per night, inclusive of supper and breakfast, but tax and attendance excluded.

How to reach Shirahama: There is a straight flight every day from each of Tokyo (Haneda Air Port) and Osaka (Itami Air Port) to Shirahama. By express trains of the New Tôkaidô Line, it takes 3.5 to 4.5 hours from Tokyo to Osaka, and further about 3 hours from Osaka to Shirahama by local trains.

Fare for flight: Tokyo-Shirahama ca. 8,000 yen
Osaka-Shirahama ca. 5,000 yen
for trains: Tokyo-Shirahama ca. 5,600 yen for economical class
Osaka-Shirahama ca. 1,000 yen for economical class

Further details will be shown by the second announcement. You will see some member of the Seto Marine Biological Laboratory at the air port or railway station of Shirahama if the exact date and time of your arrival is shown by telephone or telegraph in advance.

Travel funds: It is very regretted that no funds are available to cover travelling.

Registration fee: A registration fee of 10,000 yen. This will be used to cover the cost of excursions, publication, etc.

Registration form: Would you please fill the enclosed registration form and return it to Dr. Takasi TOKIOKA, Seto Marine Biological Laboratory, Shirahama, Wakayama-ken, JAPAN 649–22, as soon as possible, by June 30th at the latest, as this will enable us to issue the second announcement around the middle of July, in which the approximate number of participants is to be given.

Huzio UTINOMI
Director of the Seto Marine Biological Laboratory, Shirahama

and

Tohru UCHIDA
Research Director of the Sabiura Marine Park Research Station, Kushimoto

Cost for the accomodation and fare for inland travelling are subject to change because of undesirable trend to a world-wide inflation.

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Dr. FUSE, SHIN-ICHIRO
Dr. NISHIMURA, SABURO
Mr. TANASE, HIDETOMO
} Seto Marine Biological Laboratory

Mr. MORINO, HIROSHI
Mr. NUNOMURA, NOBORU
Mr. YAMANISHI, RYOHEI
Mr. YANAGISAWA, YASUNOBU
} Graduate students at the Seto Marine Biological Laboratory

Dr. HAYASHI, KEN-ICHI
Miss SASAKI, TAMIKO
Mr. TATSUKI, TAKESHI
Mr. UCHIDA, HIRO-OMI
} Sabiura Marine Park Research Station

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Mr. YAMAMOTO, TORAO: Rinkai, Shirahama, Wakayama-ken, JAPAN 649–22

RECORD OF THE SYMPOSIUM

October 16th (Mon.), in Koganoi Hotel, Shirahama

9:00– 9:30 Registration

9:30–10:00 Opening address ..... Dr. T. UCHIDA

Chairman: Dr. T. UCHIDA

Introductory lecture ..... Dr. B. WERNER

(30 minutes for coffee time and free talking)

10:30–12:00 Chairman: Dr. A. BRINCKMANN-VOSS

1. Introduction to His Majesty's biological works (Abstracts of two papers recently prepared by His Majesty were distributed). ..... Dr. I. TOMIYAMA
2. Contributory thoughts on form, function, habitat and classification of hydroids and medusae. ..... Dr. C. EDWARDS
3. Auto-epizoism as a factor in hydroid evolution. ..... Dr. N.A.H. MILLARD

(60 minutes for lunch)

13:00–15:00 Chairman: Dr. G.O. MACKIE

4. New investigations on systematics and evolution of Scyphozoa and Cnidaria. ..... Dr. B. WERNER
5. Developmental aspects of strobilation in *Aurelia aurita.* .....Dr. K. KATO
6. Induction of metamorphosis by bacteria and by ions in the planulae of *Hydractinia echinata* (Hydrozoa). ..... Dr. W.A. MÜLLER

(60 minutes for coffee time and free talking. A desk of Japan Travels Bureau was open for further trips of attendants.)

16:00–17:30 Chairman: Dr. W.A. MÜLLER

7. On the polyp and medusa of a hydromedusa, *Gastroblasta chengshanensis.* ..... Dr. Y. SUGIURA
8. Ecological distribution of epiphytic Hydrozoa. .. Dr. M. NISHIHIRA
9. The cellular basis of hydroid morphogenesis. .. Dr. M. BRAVERMAN

18:00–19:30 Reception and supper, by sponsors.

October 17th (Tues.), in Sabiura Marine Park Research Station, Kushimoto

8:30 Leave Shirahama, by bus.

10:00 Arrive in Kushimoto.

(30 minutes for coffee time)

10:30–12:00 Chairman: Dr. D.M. CHAPMAN

10. Cell proliferation as an index of growth in corals. Incorporation of ^{3}H-thymidine. ..... Dr. D. CHENEY

11. Electron microscopy on symbiotic algae in coelenterates. ..... Dr. S. KAWAGUTI
12. Electron microscopy on skeletons in coelenterates. ..... Dr. Y. KAMISHIMA

12:00–14:00 For lunch and studies of the Marine Park Center.

14:00–15:30 Chairman: Dr. S. KAWAGUTI

13. Some experiments on the symbiotic association between sea anemone and *Amphiprion*. ..... Miss Y. FUKUI
14. Coral reef recovery following extensive damage by the "crown-of-thorns" starfish, *Acanthaster planci* (L.). ..... Dr. H.R. RANDALL
15. Reproductive cycle in a zoanthid, *Palythoa tuberculosa* ESPER. (by YAMAZATO, K., YOSHIMOTO, F. and YOSHIHARA, N.) ..... Dr. K. YAMAZATO

(30 minutes for coffee time and free talking)

16:00–17:00 Chairman: Dr. H.R. RANDALL

16. Purification of the toxin in a zoanthid, *Palythoa tuberculosa* (by KIMURA, S. and HASHIMOTO, Y.) ..... Mr. S. KIMURA
17. Screening of toxic corals and isolation of a toxic polypeptide from *Goniopora* spp. (by HASHIMOTO, Y. and ASHIDA, K.) ..... Mr. K. ASHIDA

Parallel Sessions

10:30–12:00 Chairman: Dr. C. EDWARDS

P1. Two new life-cycles of the families Eutimidae and Eirenidae (Cnidaria, Leptomedusae—Thecata)... Dr. A. BRINCKMANN-VOSS
P2. *Limnocnida indica* in Africa? A systematic review... Dr. H. THIEL
P3. On some new or little known corals from Japan and Australia. ..... Dr. M. EGUCHI

14:00–15:30 Chairman: Dr. H. THIEL

P4. The life history of *Eperetmus typus* BIGELOW and the systematics of the family Olindiadidae. ..... Dr. Z. NAGAO
P5. Polyp and medusa of the hydroid *Spaerocoryne multitentaculata* (WARREN) from Japan. ..... Dr. M. YAMADA
P6. Rediscovery of an enigmatic octocoral, *Pseudogorgia godeffroyi* (by UTINOMI, H. and HARADA, E.) ..... Dr. E. HARADA

17:00–18:30 Reception with a banquet, held by Dr. T. TAMURA, the director of the Marine Parks Center.

18:30 Leave Kushimoto, by bus.

20:00 Arrive in Shirahama.

October 18th (Wed.), in Koganoi Hotel, Shirahama

9:00–10:40 Chairman: Dr. M.L. PASSANO

18. Hydra's transmitting systems (by KASS-SIMON, G.) ..... Dr. L.M. PASSANO
19. Sense organs, nervous control, and movement in medusa. ..... Dr. M. TAMASIGE
20. Contractile activities of the acontial filaments of *Diadumene luciae*. ..... Dr. T. WADA

11:10–12:15 Chairman: Dr. M. TAMASIGE

21. Electron microscopy on the photoreceptors of an anthomedusa and a scyphomedusa. (by YAMASU, T. and YOSHIDA, M.) ..... Dr. T. YAMASU
22. Electrical activities of the anthomedusan, *Spirocodon saltatrix*, with special reference to the shadow reflex (by YOSHIDA, M. and OHTSU, K.) ..... Dr. M. YOSHIDA

Projection of an additional slide by Dr. M. BRAVERMAN

(60 minutes for lunch)

13:15–15:15 Chairman: Dr. R. WEILL

23. Interepithelial flagella in the medusa of *Aurelia aurita* (L.). ..... Dr. D.M. CHAPMAN
24. The fine structure of the mesogloea of the column of *Pachycerianthus fimbriatus* (Anthozoa) (by ARAI, M.N. and KARAKASHIAN, S.) ..... Dr. M. N. ARAI
25. Structure and electrophysiology of the giant axon system in *Nanomia*. ..... Dr. G.O. MACKIE
26. Differentiation and symbiosis in two hydrozoans. ..... Dr. Y. KAKINUMA

(30 minutes for coffee time and free talking)

15:45–17:00 Chairman: Dr. M.N. ARAI

27. The discharge of nematocysts in relation to properties of the capsule. ..... Dr. E. A. ROBSON
28. The "Cnidoblast" as an excitable system. .... Dr. T. M. YANAGITA

17:15–19:30 Film projection

F1. Chairman: Dr. E. A. ROBSON

1. Discharge of coelenterate nematocysts. ..... Dr. R. WEILL

Comment BRAVERMAN: At the beginning of the film, we saw some prey animal being passed from tentacle to tentacle. Does any one know how this release mechanism is effected?

F2–F5. Chairman: Dr. E. HARADA

2. Locomotion of *Gonactina prolifera* (by ROBSON, E. A.)

Discussion WERNER: Has *Gonactinia* no other sort of movement? I have seen in another small actinian not described up to now a slow and continuous movement in aboral direction

which is performed by slow contraction waves.
ROBSON: Locomotion in *Gonactinia* is by means of walking, or stepping, using the tentacles, and occasionally by swimming after strong stimuli. Basilar muscles are absent from the pedal disk, and creeping or burrowing movements are not possible.

3. Passengers or partners? (by ROSS, D.)
4. Feeding of *Sarsia*. (by HERNANDEZ-NICAISE, M.-L. and PASSANO, L.M.)
5. In some spaces of the sea: a Japanese film. (海の生物誌)

October 19th (Thurs.), in Koganoi Hotel, Shirahama

9:00–10:40 Chairman: Dr. M. YOSHIDA

29. A comparison between the behavioral coordinating system of scyphozoan and hydrozoan medusae. ..... Dr. L.M. PASSANO
30. A comparative review of the behavior of sea anemones. ..... Dr. D. ROSS
31. Ecological studies on the jelly-fish, *Aurelia aurita*, in Urazoko Bay, Fukui Pref. VIII. Diel change of the vertical distribution of the medusa in early fall, 1969. ..... Mr. T. YASUDA

(30 minutes for coffee time and free talking)

11:10–12:10 Chairman: Dr. D. ROSS

32. On some physiological aspects in the daily rhythmical activity of the sea-pen, *Cavernularia obesa* VALENCIENNES...Mr. M. IMAFUKU
33. Studies on the daily rhythmic activity of the sea-pen, *Cavernularia obesa* VALENCIENNES: XVIII. Ontogenic development of the daily rhythmic activity (by MORI, S. and TANASE, H.)..Dr. S. MORI

12:10–12:30 Closing address, with some comments on proposed next symposium in 1976. ..... Dr. D. ROSS

(60 minutes for lunch)

13:30–17:30 Excursion in Shirahama: Fisheries Experimental Station of Kinki University—Hatakejima Island—Seto Marine Biological Laboratory (a short rest).

18:00–20:00 Reception held by the Mayor of Shirahama.

Fifty-six biologists had been expected to be regular attendants, but ten of them were unable to be in Shirahama because of illness, duties, or having no available funds for travelling. As stated in Dr. WERNER's introductory lecture, it was proposed to send a message to His Majesty thanking for his great regard to the Symposium and another to Dr. E. HIRAI, one of the proposers of the Symposium and very unfortunately still in a hospital bed at that time, to cheer him. In addition to these an appeal for the conservation of the nature of the sea in the district was made as follows.

CONTENTS

II. Morphogenesis and Developmental Physiology

III. Behaviour and Ecology

OPENING ADDRESS

Ladies and Gentlemen,

It is with the greatest pleasure that we rise to open the Second International Symposium on Cnidaria in this country.

Since the first symposium which was held in London in 1965, investigations on Cnidaria have been much progressed in several aspects and this has urged us to hold the second international symposium. I hope that we shall have in future further symposia on Cnidaria somewhere else in the world.

Here, especially for Japanese attendants, it must be their duty and agreeable task to welcome all the participants who have come from abroad to this country to attend the present symposium.

I wish to close this very short opening address by expecting that the symposium will be fruitful and also that all attendants and their families will enjoy their stay in this town and country.

Thank you.

Tohru UCHIDA

INTERNATIONAL SYMPOSIUM ON CNIDARIA

CLOSING REMARKS

It is a severe test to wind up this Symposium, whose sessions have spread over four days. I have become very much aware of the times that I failed to listen, and if I were to attempt to pick out the highlights of our meetings, it would probably become obvious to you that I failed to recognize the importance of some of the contributions to our proceedings. Therefore I will not aim at highlights but I will attempt only to indicate where in my opinion studies on the Cnidaria are going and to compare this meeting with the three previous ones, all of which I have attended, at Miami, London and Knoxville. This time we had more papers and more accounts of research in progress and fewer general reviews. This is a healthy trend and highly appropriate on this occasion. There are five areas of study that have appeared as major themes in the papers that we have heard.

1) *Evolutionary Morphology.* We began with two views of the basic evolutionary problem in the Cnidaria. I refer to the papers of Drs. EDWARDS and WERNER in which contrasting positions were taken up regarding the old problem of the primacy of polyp or medusa in the early evolution of the phylum. This has always been a basic question on which there are certain things to be said on each side but the important thing is that posing the question stimulates investigations out of which flow new observations and ideas. We have seen this amply demonstrated here. As so often happens such studies lead us to reconsider the systematic positions of some old friends. And on this occasion we witnessed the promotion of a minor group, the Cubomedusae to a major taxon, the Cubozoa, Dr. WERNER's new, and for me surprising candidate as the evolutionary link between the Scyphomedusae and the Hydrozoa.

2) *Cellular Studies.* The several papers in this field left me with the impression that many more organisms need to be studied before one can generalize about morphogenesis in hydroids. We saw evidence here too of the new light that can be thrown on this problem by the use of newer techniques that are now available.

3) *Life Histories.* Many examples have come out of these meetings of the splendid studies on life histories for which Japanese workers on the Cnidaria are so renowned. Obviously, there are still important discoveries to be made in this field and it has been a particular pleasure for your overseas visitors to have met some of the well known workers in this field, in many cases for the first time.

4) *Electrophysiology and Electron Microscopy.* I couple these two fields of study because they deal with the application of the two major instruments which nowadays enable us to probe into structure and function at the cellular and subcellular level. In a few cases these instruments are being used together with very

interesting results. I have noted the particular success of Professor KAWAGUTI and his group in using the electron microscope to reveal some of the remarkable features of coral diversity and coral building. Probably we have only begun to sample the sum of information that an electron microscope can provide. If we look at the progress that has been made in recent years in the application of electrophysiological methods to the Cnidaria, we cannot fail to be impressed. One can have every confidence that Drs. MACKIE and PASSANO will show how the excitable cells and tissues of medusae work, even though one may expect that their simpler hypotheses will have to give way to more complex ones as time goes on. It is pleasing to see other workers taking up this approach, including Drs. YOSHIDA and TAMASHIGE from our host country.

5) *NEMATOCYSTS.* I have to close this review by expressing regret that in this Symposium on the Cnidaria, there is not more work to report on the nematocysts. We know this is a difficult field in which ultrastructural, experimental, chemical and physical techniques are all required to make a real impact. Dr. ROBSON reminded us of the elegance of some of these devices and it was pointed out by Dr. WEILL that the whole problem of the nature and the function of the spirocysts has never been resolved. When we recall that nematocysts are the chief claim to fame of the Cnidaria, we must admit that more of us should be directing our energies towards studies in this field.

In conclusion, I have a few general comments to make. First, notable as this Symposium has been, one must note with great regret, the absentees who, if they had been able to come, would have made our deliberations much more rewarding. I am thinking of names like MACFARLANE, MARISCAL, WESTFALL, DE CECCATTY, TARDENT, all of whom at one time had hoped to be here and some of whom had prepared papers for the meetings.

The great positive gain at this meeting undoubtedly has been the opportunity for the Japanese workers on the Cnidaria and their colleagues from overseas to meet on Japanese soil and exchange their experiences. This brought us in contact with you as a group, and this is so much better than meeting you as individuals on those occasions when you have by chance attended meetings or come as visiting investigators to our countries. I think I am speaking for all our visitors when I say that we can only congratulate you on the range of your studies and the number of your younger investigators who have been attracted to these important and fascinating animals. Some of us are extending the contacts established here by visiting your laboratories before we return home. This is a particularly valuable fringe benefit of the Symposium. Indeed, all workers on the Cnidaria have occasion to envy you somewhat becuase you are blessed with such a superb cnidarian fauna extending from Hokkaido to Kyushu and beyond to Okinawa. I doubt whether a more varied and richer cnidarian fauna could be found elsewhere on the globe. It is a splendid asset and it is clear that you are making good use of it in your researches.

I would be very remiss if I did not make a special comment on one aspect of this

meeting, namely the example that was given us of the traditional Japanese courtesy to your guests. Quite apart from all the hospitality we have received, I must say that your choice of English as the only language of this Symposium was a courtesy of a very special kind. I am very conscious of this fact that this decision created some very serious problems for some of our Japanese friends in communicating their results to this Symposium. I want to thank you for this courtesy on behalf of the visitors. It helped our proceedings immensely by eliminating the need for translations but it was done at the cost of great inconvenience and hardship to some of your speakers.

There are also a number of individuals and groups to be singled out at this time and thanked for contributions which added greatly to the success of this Symposium. I have noted those students and staff members, particularly of the Seto Marine Biological Laboratory, who have acted as hosts and guides and whose work both open and behind the scenes made our Symposium run smoothly and without the breakdowns that so often mar a meeting of this kind. And there are the hotels of Shirahama who helped us to enjoy unique comforts and service that are to be found in Japanese ryokan. A special expression of gratitude must be extended to the Director and the staff of the Sabiura Laboratory of the Marine Park Center of Kushimoto, where we all spent a memorable day and saw a facility which made some of us very envious indeed. At an earlier stage of the meeting we heard about the support and encouragement that has been given to this meeting by other bodies and individuals throughout Japan and in particular by His Majesty the Emperor. But finally and above all, I want to extend our thanks to one man who has provided the essential practical leadership and drive which any scientific meeting must have in the person of one man if it is to be a success. I refer of course to our good friend, Dr. Takasi TOKIOKA, the senior researcher of the Seto Marine Biological Laboratory and I invite him to come to the platform at this time to receive a small token of our thanks and esteem which will be presented to him by Dr. WERNER.

Now we come to the last act of our Symposium. This is not simply a matter of closing this Symposium but of opening up the question of where and when we should meet again. It happens that two possibilities have been discussed informally during this meeting. Dr. WERNER came here with a warm invitation from Dr. Pierre TARDENT to meet next in Switzerland, a prospect which any one of us would find very enticing. On the other hand, this meeting has had a rather disproportionately large group of Canadian investigators and it seems that studies on the Cnidaria are fairly well established in our country. We suggest to our friends here that they consider the possibility of meeting next in Canada, probably at Vancouver or Victoria on the Pacific Coast. That region has a cnidarian fauna of considerable interest besides having several universities within a fairly small area. Close together also are the Friday Harbor Laboratories of the University of Washington, the Pacific Biological Station at Nanaimo, and our own new Bamfield Marine Station on the west coast of Vancouver Island, which is supported by several Canadian universities.

One circumstance which may affect the timing of such a meeting, if you are interested in this proposal, is the Pacific Science Congress which meets in Vancouver in 1975. By timing our meetings to just proceed or follow that congress, it may be possible to assist some of the cnidarian workers who would be coming from Trans-pacific countries to attend the meetings. You will understand however that at this stage we are suggesting this as a possibility and in view of the interest you have expressed in this proposal, we intend to explore all possible means of support and to consider very carefully the advantages and disadvantages of the two years 1975 and 1976 which have been suggested and of the different locations that are available.

It is always rather a sad occasion to close down a scientific meeting but on this occasion my sadness is mitigated by the hope that we shall have the opportunity of seeing many of you again three or four years hence in our own country and picking up once again the threads of our researches on our favorite animals and hearing how these have been going on in the intervening years.

D.M. Ross

REPORTS ON CLOSING ACCOUNTS AND PUBLICATION

November 29, 1972

It is our great pleasure to inform you that the accounts of the Symposium have been settled quite usually without any troubles.

Preparation and forwarding works of notes for announcements or information and some significant part of transportation during the Symposium were done by members of and at the expense of the Seto Marine Biological Laboratory. The Sabiura Marine Park Research Station was responsible for all arrangements and expenses for one of the four days of the Symposium, October the 17th.

Again, the Seto Marine Biological Laboratory will be responsible for the publication of the proceedings of the Symposium.

Other expenses were paid from the fund of the Symposium, which was raised by donation and collection of registration fee; the balance sheet and the list of donators are given below.

BALANCE SHEET (on October 31, 1972)

Incomings:	
Donations	1,045,000 yen
Registration fee	520,000 yen
Charge for a listener to a few lectures	2,300 yen
Interest	1,687 yen
Total	1,568,987 yen
Outgoings:	
To Koganoi Hotel; for rent of hall, luncheon, reception, coffee and tea, and all other services inclusive of taxi fare and telephone charge.	717,000 yen
For transportation; hire of microbus and taxi fare.	13,670 yen
Hotel charge for Dr. J. DAN, an adviser for Japanese attendants.	25,000 yen
Reward to Mr. M. IMAFUKU, a secretary to the organizer of the symposium.	10,000 yen
Miscellaneous payments; charge for sending money, etc.	2,435 yen
Total	768,105 yen

The balance in hand, 800,882 yen in TSUJI's account in Kushimoto Branch of Kiyo Bank, to be paid to cover a part of the publishing expense of the proceedings.

Donators

	Yen
Imperial grant	100,000
The late Dr. Taku KOMAI (Kyoto)	100,000
Dr. Tohru UCHIDA (Tokyo)	100,000
Dr. Yoshitaka NISHIZUME, Dr. Itaru UCHIDA, and Mr. Takeshi YANAI (Himeji)	50,000
Mr. Hiroshi SANADA (Himeji)	10,000
Kansai Electric Power Company	50,000
Mr. Yutaka ONODERA and Mr. Teizo HIROZAWA (Shirahama)	100,000
Mr. Jimbei YAGURA (Kushimoto)	10,000
Mr. Shujiro KOYAMA (Tanabe)	10,000
Dr. Tsuneo TAYA (Tanabe)	50,000
Mr. Masao OOHASHI (Governor of Wakayama Prefecture)	50,000
Mr. Shigeru IWAHASHI (Dean of Fishermen's Union of Shirahama)	30,000
Mr. Zen'ichiro TSUJIMURA (President of Shirahama Hot Spring and Real Estate Company)	30,000
Shirahama Rotary Club	20,000
Mr. Shoichi MAÉDA (Shirahama)	50,000
Mr. Sadao HASEGAWA (Himeji)	10,000
Mr. Shozo YAMAZAKI (Himeji)	15,000
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Mr. Kunio MIYAKE (Takasago)	10,000
Mr. Yoshiro MIYAMOTO (Himeji)	10,000
Mr. Yasunori SETO (Tatsuno)	10,000
Mr. Masatoshi TAKEGAWA (Himeji)	10,000
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Mr. Tamotsu OKADA (Himeji)	10,000
Mr. Hiroshi JIMBO (Himeji)	10,000
Mr. Matsuzo YAGI (Himeji)	10,000
Mr. Shin'ichi SAITO (President of SAITO SHOZO Shoten, Tokyo)	50,000
Mr. Hideo TOKUCHIN (Osaka)	30,000
Mr. Masakichi URA (Shirahama)	10,000
Takasago Shop of MINATOGAWA Pharmacy (Takasago)	10,000
Himeji Shop of HYOTO Medicine Trade Company (Himeji)	10,000
Mr. Sueto FURUOKA (President of GAKKEN Publishing Company, Tokyo)	50,000
Mr. Saburobei NAKAYAMA (President of NAKAYAMA Shoten, Tokyo)	10,000

In addition to the donators recorded above, a memorable reception was held for the attendants of the Symposium by the courtesy of the Town of Shirahama, and

some personal gifts were made at that time by Mr. Shozo WATANABE (the Mayor of Shirahama), Mr. Shigeo SEMI (Chairman of the Town Council) and Mr. Harukichi TOKO (the deputy director of the Union of Hotels and Ryokans in Shirahama). As the Mayor was abroad for official duties, Mr. T. KIKUHARA, the Deputy Mayor of the Town, was the actual host. Our sincere thanks to the Town may be expressed best in the following words presented by Prof. R. WEILL to the Deputy Mayor.

Mister Deputy Mayor,

I have been asked to address you in the name of this attendance, particularly of those of your guests who have come from foreign countries. I wonder why I deserved this privilege; I owe it perhaps to my age, since I am the dean among your guests from abroad. Perhaps also because I paid my first visit to Japan 45 years ago, where I have met Dr. UCHIDA, whom I had already known in France; and we are pleased, Dr. UCHIDA and I, to evoke this week many names and memories of that time. There might be even a third reason, although my colleagues here could not have known it: it happens that I, too, am the deputy mayor of my home city in France and have been it for many years. This enables me to appreciate the long and beautiful tradition of generosity and hospitality, it means for a municipality to offer such a magnificent reception as we are enjoying to-night.

I wonder, Mr. Mayor, if in doing so you have not tried yourself a biological experience. A very frequent type of ecological experimentation consists in placing all kinds of animals in surroundings that are quite new to them or at least strange and unusual, and then to observe their behaviour, their feeding behaviour especially, their reactions to sounds or to unusual substrata. The experimenting biologist looks at it with interest, tries to understand, proposes some conclusions, but never in the least does he care about how the animals themselves feel about it and what they think of him. And indeed, even if he were to wonder, he would get no answer, since animals usually cannot convey their feelings in an adequate way.

Well, Mr. Mayor, I hope *we* can, and I want to assure you that we really appreciated and thoroughly enjoyed this experience, inspite an eventual clumsiness that would be due to the fact that we are differently conditioned. This wonderful reception is thus the closing episode of this scientific meeting and of our stay in Shirahama. It will last in our memory. We shall never forget the friendliness, the kindness, the courtesy we enjoyed in your city. With our sincere wishes for its welfare and happy future I beg you, Mr. Mayor, to accept our best wishes for yourself, and our most sincere thanks.

Prof. ROBERT WEILL

Mr. Minoru TSUDA, President of Shirahama Glass-bottomed Boat Company, offered one of his boats for excursion.

Mr. Kiyoshi INOUYE in Himeji presented special packets of safety match to be distributed to the attendants.

With our deepest thanks, all these are here confirmed and reported to every donator and attendant.

Atsushi TSUJI
Executive of the Symposium

Tohru UCHIDA
President of the Symposium

Publication

In all, 750 copies were printed:

480 copies	for distribution through the Seto Marine Biological Laboratory,
70 copies	for regular attendants and 12 other contributors,
100 copies	as reprints of respective papers, and
100 copies	for sale,

at a cost of 4,200,000 yen.

The payment was made as follows:

800,000 yen	from the balance in TSUJI's account,
2,700,000 yen	from the Seto Marine Biological Laboratory,
700,000 yen	wholesale price of 100 copies (to Nippon Printing and Publishing Co. Ltd.)
4,200,000 yen.	

The remains (882 yen) in TSUJI's account were used to cover a part of postage during the editorial works.

The editors were merely a tunnel, through which every matter reached the destination, but without any refinement; and even this would not have been achieved if they could not have the effectual assistance of Miss Yoshiko HOSO'O. They would like to express their sincere thanks to her, and at the same time to ask the contributors for their generosity to overlook the first mentioned above.

T. TOKIOKA and S. NISHIMURA

June 1, 1973

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